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THE ARCTIC MANUAL

Manual of the Natural History, Geology, and Physics of Greenland and the Neighbouring Regions. By T. Rupert Jones, F.R.S., and W. G. Adams, M.A., F.R.S. Edited by Prof. T. Rupert Jones, F.R.S., under the direction of the Arctic Committee of the Royal Society. (Published by Authority of the Lords Commissioners of the Admiralty, 1875.)

THE Arctic explorers, to whom we must all give a hearty God-speed now they have started on their journey, besides being supplied with "Instructions" as to the points on which information is most required, and as to the manner in which they may best obtain it, have had compiled for them a most comprehensive "Manual" of what has already been done with regard to the natural history and physics of the northern regions. The time devoted to this work has been short, but the compilers have made the most of it, and their names are guarantees that the information is as complete as possible.

The book consists of a series of reprints of the latest and most trustworthy papers that have been written on the various subjects included. No other form of "Manual" would have been half so useful, even if there had been time to compile it. The limited area within which the exploration is to be conducted has made it possible to include all these in one handy volume. What would not an ordinary naturalist give to have all the previous work that had been done upon the district he was visiting collected together for him, instead of his having to search for it over scattered volumes? and how much more valuable it would be if it were revised up to the latest date by the authors themselves. This is what has been done for the Arctic naturalists, who will be cut off for years from all books but those they take with them, and to whom this work will therefore be of inestimable value. Of course we are not to understand that all that has been written on the natural history and physics of the Arctic regions is here reproduced; that would have been impossible: but in the first part complete catalogues are given, without the descriptions of the genera or species that have been named from Arctic specimens; and the second part, to which less time has been allowed, and which is less complete, contains only the most important portions of the papers or works from which extracts have been made.

It is not the Arctic voyagers, however, who alone will benefit by this Manual. Those who will follow them in thought in their perilous but splendid undertaking will find their interest increased, if this be possible, by the many questions for solution which its perusal will raise in their minds, and they will the more easily compare what was known *before* the expedition with that which we hope will be known after its return.

We proceed to give our readers some idea of the contents of this "Manual." Although the list of papers is no doubt scanty compared with what might be formed of more temperate climes, many no doubt will be astonished that so much has been done in the natural history of these inhospitable regions, far more in proportion than the observations of physical data.

The first part, devoted to Biology and Geology, is

divided geographically into three sections; the first, on West Greenland, including Davis' Strait, Baffin's Bay, Smith's Sound, and Kennedy Channel; the second, the Parry Islands and East Arctic America; and the third, East Greenland, Spitzbergen, Franz-Joseph Land, &c. All these between them have 111 illustrative papers, many being double ones. They are arranged in each section zoologically, the first paper being by Dr. Robert Brown, on the Mammals of Greenland, of which there appear to be thirty-one now known, exclusive of introductions by the colonists; all but seven of which inhabit the sea. This paper is followed by two others by the same author, published about the same time (1860), containing his accounts of the species and habits of the Whales, Seals, and Walrus. Many such accounts have been published; they are always read with interest, and we have no doubt much further light will be thrown by the expedition on these animals, some of which are as yet only known by their skulls sent home to museums. There are six species of Greenland Seals, all sufficiently distinct to be placed in different genera, though one is often confounded with another. The chief are the Common Seal (*Callocephalus vitulinus*), the Saddleback, the male and female of which are of different colours, the Grey Seal, and the Bladder-nosed Seal, the latter of which was till lately represented in the Zoological Gardens by a living specimen. There is also the Walrus, large numbers of which used to inhabit British waters during the crag period, but of which only two have as yet been brought alive to England, where they survived but a short time. The Cetacea are more numerous, having sixteen representatives, including the Dolphins and Porpoise. Dr. Brown gives interesting details respecting several of these, of which we need only mention the voracity of the Killer (*Orca gladiator*), out of whose stomach Dr. Eschricht took thirteen porpoises and fourteen seals, the voracious animal having been choked by the skin of a fifteenth. A case is known in which they attacked a white-painted herring-boat in the Western Islands, probably mistaking it for a Beluga or White Whale.

From the Mammals we come to the Birds, the notes on which are contributed in a separate paper by Prof. Alfred Newton, the list being compiled by him from all available sources. The number of true denizens reaches sixty-three, of which, however, only forty-seven occur within the Arctic circle, and not more than thirty-six, if so many, may be expected in Smith's Sound. These are printed in a thicker type to draw attention to them, and short notes are given by which they may be distinguished even by those observers who are not professed naturalists. Prof. Newton is very severe on the former expeditions for "so ingloriously missing their glorious opportunities" in ornithology, "through the absence of special naturalists;" but this will not apply to the present one.

For the catalogues of the Fishes and most of the remaining classes of animals we have to go to Denmark, Drs. Lütken and Mörch, of Copenhagen, being the chief authorities on these branches—and they have both revised their lists to the latest date. The former writer has in preparation an "Ichthyology of Greenland," and the list of fishes here given is only provisional till that is completed. The number reaches seventy-eight, the greater number of course being Teleosteans, and many

inhabitants of great depths, and consequently rare in collections, eighteen only being well represented in those of Britain.

Dr. Mörch's list of the Mollusca, including land, freshwater, and marine forms, reaches a total of 216, which are arranged after his own modification of Latreille's classification. As this is not the classification usually adopted or known in England, it may be well to indicate it. The Mollusca proper are divided into five classes. The first, *Androgyna*, Mörch, includes the five orders: *Grophila*, Fér., or land shells; *Hygrophila*, Fér., or freshwater shells; *Ptenoglossata*, Trochsel; *Gymnobranchia*, Cuv.; and *Pteropoda*, Cuv. The second class, *Dioica*, Latr., is divided into the three orders, *Tanio-*, *Toxo-*, and *Rhachiglossata* of Trochsel, after the characters of their tongues. The third class, *Exocephala*, Latr., is divided in the same way, into *Rhipido-* and *Heteroglossata*; while the remaining two classes, *Cephalopoda* and *Acephala*, are undivided, although there are enumerated species of the different orders as usually distinguished in the latter class. The *Brachiopoda* figure for four species in addition to the above, under the title of *Brachionopoda*. The *Tunicata* number thirteen species, and require revision, while the *Polyzoa* mount to sixty-three. Of the Insects nothing is recorded since Schiödte's list in 1857 of 114 species; of Arachnida there are almost none but a few Acari. The list of Crustacea is a large one, and has been revised by Dr. Lütken for this Manual. The whole number is 184, of which no less than seventy are *Amphipoda*. Yet this list is plainly incomplete, the *Ostracoda* being represented by one species only, while in the next paper Dr. Brady enumerates twenty-four from their shells. The other classes of animals have similar lists. In the Annelids most families are represented by a few species; the various Entozoa are tabulated. The Echinoderms are thirty-four, containing only one Echinid: the remaining lists are short ones, except that of the fixed Hydrozoa, and the Sponges, which are pretty numerous. It is useless, of course, to catalogue "species" of Foraminifera, and only a few notes are accordingly given of the various generic forms which have been met with at various depths, with a description of the nature of the materials in which they occur.

From animals we pass to plants. The first paper is the well-known one by Dr. Hooker, "Outlines of the Distribution of Arctic Plants," from the Linnean Society's Transactions for 1861, which has been reprinted with little alteration, chiefly from want of time, the more recent discoveries being given in foot-notes. The list of flowering plants contains those from the districts of Arctic East America and Greenland only, which number 552, of which about two-fifths are Monocotyledons, and the remainder Dicotyledons. Mr. Taylor's paper, on the Plants of Davis' Strait, though without the generalisations of the former, gives more details on the habitats and localities of the specimens; but this paper also is one of old date (1862). The Cryptogams are enumerated in various papers on the several sections to which separate students usually devote themselves; the most important being Dr. Lindsay's, on the Lichen Flora of Greenland and other Arctic Regions, from the Transactions of the Botanical Society of Edinburgh for 1869. As lichens will grow where nothing else will, their various species

may naturally be expected to make a large figure in an Arctic flora; and so they actually do, as they number by themselves half as many as all the flowering plants together. The Diatoms, which in their vast numbers cause the discoloration of some portions of the Arctic seas, form the subject of another interesting paper by Dr. Brown.

When we reach the portion of the Manual relating to Geology, we find some part of the information to be of very ancient date, belonging to the days of Flätz-Trapp-Formation and other exploded terms, which now convey no information whatever. The interest of these papers, written by Sir Charles Giesecke in the beginning of this century, is mineralogical. He was a careful collector and diligent observer, and his records are still valuable. One of his chief discoveries was an easily fused mineral he named cryolite, which is now an abundant source of aluminium. To this two papers are devoted. Shortly following these we have Dr. Sutherland's paper, no less valuable because some twenty years old, on the Geological and Glacial Phenomena of the Coasts of Davis' Straits and Baffin's Bay, which contains many observations on the ice-phenomena both of small and large masses. The Miocene Flora of Greenland, so admirably described by Prof. Oswald Heer in his "Flora Fossilis Arctica," and catalogued in other works, cannot of course in a small Manual like the present receive more than a comparatively brief notice, nor can it be needed, as it is an essentially standard work. There is also a Cretaceous Flora catalogued from the "Kome Formation" of the north coast of Noursoak Peninsula. Undoubtedly the most interesting paper in this section is that of Prof. Nordenskjöld, extracted from the *Geological Magazine*, in which he gave an account of his fruitful expedition to Greenland in the year 1870. The united papers that detail his experiences are together of considerable length. He made one of the very few attempts that have yet been made to enter the great continental icefield, and succeeded in passing over thirty miles, the interesting details of the journey being here recorded; and much valuable information was thus obtained. The new expedition will have great opportunities of such explorations, which is a reason for regretting the absence from it of any professed geologist. Prof. Nordenskjöld gives an account also of the various strata of the coast, which exhibit beds of Cretaceous and Miocene age, with some basalts which are associated with them. One of the most interesting discoveries made by him was that of three large masses of meteoric iron at Ovifak, of which a woodcut and analyses are here given, with full accounts of its various points of interest. This latter recital is very naturally followed by that portion of Dr. Flight's recent contributions to the *Geological Magazine* on Meteorites, which relates to those found in Greenland. This contains the results of the newer Swedish Expedition of 1871, together with further details about the stones themselves, as compared with other meteorites. The two chief remaining papers in this division are, first, a valuable abstract of geological notes on Noursoak Peninsula and Disco Island, by Dr. Robert Brown, which is only just published in the Transactions of the Glasgow Geological Society, and contains a succinct account of the geology of that part of Greenland as made out by various explorers; and secondly, a

collection of notes by Henry H. Howorth of the several observations that have established the fact of the rising of the circumpolar land.

We have now passed in review the chief portion of this Manual, which occupies 500 out of its 750 pages, and relates to that portion of the Arctic regions whither the explorers are in the first instance bound. The remaining portion of the Natural History division—occupied with Parry Island and East Greenland—consists of shorter papers and far barer catalogues. These perhaps require no observations beyond noticing the fact—recently pointed out also by Mr. De Rance in our columns—that the various geological periods are much better represented in these latter districts, there being Silurian, Carboniferous, Triassic, and Jurassic, as well as Cretaceous and Tertiary rocks; and consequently we have lists of fossils supplied with which any that may be discovered may be compared. The last of the Natural History series is an extract from Mr. Woodward's paper on Glaciation, the object of the insertion of which, as it is entirely theoretical, it is difficult to understand, unless it be to give the explorers some idea of the kind of questions on which some of their geological and glacial observations may be expected to throw light.

There are two things that strike one in reading these long catalogues—(1), that he must be a well-informed naturalist to whom many of the names which belong to all classes and kingdoms of life are anything more than names; and (2), arising from this, what an advantage there is in having specific names at least as far as possible descriptive.

The second part of the Manual, relating to Physics, requires of course less detail, and is included in a far smaller number of pages. It is not constructed on exactly the same plan as the first part, but consists in a great degree in descriptions of the observations and results, instead of reprints of the original papers; nor is it so exhaustive. It is divided into eight portions, relating respectively to Meteorology, Temperature of the Sea, Formation and Composition of Sea-water Ice, Tides and Currents, Geodesy and Pendulum Experiments, Observations on Refraction and on Air, Terrestrial Magnetism, and the Aurora Borealis. Under the head of Meteorology we have a few scattered notes on the results of the numerous previous expeditions with the thermometer, barometer, &c., and a valuable table on the mean temperatures of various stations for the several months of the year. The information as to the temperature of the sea is still more meagre, and it seems to us that more might have been included with advantage. The papers selected on the Physical Properties of Ice are extremely suggestive and valuable, consisting partly of observations in Arctic regions as to the freezing-points of sea-water, and the compositions of the resulting ice and the remaining liquid, and partly of similar experiments in the laboratory.

The information also on the tides and currents is pretty full, showing what methods have been adopted in various expeditions for determining the former accurately and with what results. There are also papers of suggestions as to the probable directions and amounts of both, and the best places for observation, and on the Meteorology and Hydrography of the Austro-Hungarian North Polar Expedition. The part on Magnetism is on the same

model as the last mentioned, and is equally, if not more valuable. The last chapter, on the Aurora Borealis, is the best of all. Besides the ordinarily phenomenal observations already made, great attention is naturally paid to the spectrum of the Aurora, its connection with electrical discharges, together with Angström's views of its origin as explained in *NATURE* (vol. x. p. 246), and the opinions of Prof. Herschel and Mr. Capron, as well as those of MM. Lemström and Wijkander, deduced from observations made by them in the different Swedish expeditions, all of which are here given as fully as possible.

Such is the book with which, in addition to all others, the Arctic explorers are supplied. It is a library in one volume such as one does not often see. The mass of material it contains is something marvellous, and all is condensed as much as is advisable. The compilers must have had hard work, but they may congratulate themselves on the result. They have practically said to the Arctic voyagers—"This is what we have; go and obtain more for us." May they be successful, and return with a full cargo of information, which, if it were packed as tight as in this Manual, would not take up much room in comparison with its high value.

LAWSON'S "NEW GUINEA"

Wanderings in the Interior of New Guinea. By Capt. J. A. Lawson. With Frontispiece and Map. (Chapman and Hall, 1875.)

IT is not often that a work of fiction calls for notice in the pages of *NATURE*; but we have here an exceptional case. This book has been favourably noticed in some of the daily and weekly papers as a genuine narrative of travel and an addition to our knowledge of an almost unknown region, and it therefore becomes a duty to inform our readers that it is wholly fictitious. It is not even a clever fiction; for although the author has some literary skill and some notion of the character of savages, he is so totally ignorant of the geography and the natural history of the country he pretends to have explored, and so completely unacquainted with the exigencies of travel and exploration in trackless equatorial forests, as to crowd his pages with incidents totally unlike any that occur to the actual explorer, and with facts altogether opposed to some of the best established conclusions of physical geography. We proceed to give proofs of the accuracy of these statements. First, as to his geography. He starts from a point a little to the east of Torres Straits, of which he is so injudicious as to give the latitude and longitude (both to seconds) from his own observations. He also gives a map of his route, but without scale or meridian line. He describes himself, however, as travelling generally northwards with only such divergences as the country necessitated, and we may therefore take it that his route was nearly north, as it should have been to cross the island. But although he gives no scale to his map, he (again injudiciously) gives the dimensions of a large lake, along one side of which he travelled, as "between 60 and 70 miles long, 15 to 30 broad," which being laid down on his map furnishes an excellent scale, and shows that the total distance from his starting point in a straight line to the place he professes to have reached must have been somewhere between 560 and 620 miles.